

Department of Computer Science & Engineering

1. JAVA Full Stack Development

A full-stack developer is a developer or engineer who can build both the front end and the back end of a website. The front end (the parts of a website a user sees and interacts with) and the back end (the behind-the-scenes data storage and processing) require different skill sets. Since full-stack developers are involved with all aspects of the development process, they must have expertise in both.

A full-stack developer can work in-house or at a computer development company that engineers websites, software, and other components for other businesses.

What does a full-stack developer do?

Full-stack developers design and create websites and applications for various platforms. A full-stack developer's job description might include the following:

- Develop and maintain web services and interfaces
- Contribute to front-end and back-end development processes
- Build new product features or APIs
- Perform tests, troubleshoot software, and fix bugs
- Collaborate with other departments on projects and sprints

Skills to be acquired:

Proficiency in JAVA Full Stack Development:

Proficiency in JAVA Full Stack Development requires a strong foundation in Computer Science Engineering. The goal of JAVA Full Stack Development is to create efficient, reliable, and high-performance softwares that can be used in a wide range of applications, from consumer electronics to aerospace and defense.

Technical Knowledge:

- **Front-end development** is the process of creating the interface of a website. It entails coding details like drop-down menus, fonts, colors, and page layouts. Full-stack developers should also know how to work with front-end technologies like HTML, CSS,

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and scripting languages such as JavaScript to make websites and applications visually viable and appealing.

- **Back-end development** skills entail using back-end programming languages like JAVA PHP, Ruby on Rails, and CakePHP and understanding how algorithms and business logic work.
- **Web design** includes using software such as Photoshop to create and design graphics and themes. It'll be helpful to familiarize yourself with basic UI (user interface) design principles to help you create navigational elements, backgrounds, and audio and video elements.
- **Database management** skills are required for full-stack developers, though it is part of the skills needed for back-end web development. A full-stack developer should be able to design, understand, and manipulate database queries and web storage.

Problem-Solving Skills:

In the past few years, the job profile of a full-stack developer has increased because they are able to work with different technologies and languages. Besides this, full-stack developers are also experts to solve the anomalies raised across the different phases of the application or web development.

Problem-solving skills are crucial for success in JAVA Full Stack Development, it includes Critical thinking, Troubleshooting, Design optimization, Debugging, Decision-making, Creativity, Communication, Time management, and Attention to detail.

Courses to be completed:

There are several courses that one can complete to gain proficiency in Java Full Stack Development. The fundamental concepts and practical skills in this field are obtained from the courses IBM Full Stack Cloud Developer, IBM DevOps and Software Engineering Professional Certificate, Introduction to Web Development, Web Application Development with JavaScript and MongoDB, Full-Stack Web Development with React Specialization etc.

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Job Prospects and Salary Expectations:

Job prospects: The demand for full-stack developers is increasing day by day. They are experts in all aspects of technology. They have expertise in front-end, back-end, and database technologies. As a result, they can work on any project related to web application development, mobile app development, or even embedded system development.

Full-stack developers are versatile professionals who can work as software engineers, data scientists, solution architects, etc., depending on their skills and expertise.

Salary Expectations: Java Full Stack Developer salary in India ranges between ₹ 2.1 Lakhs to ₹ 13.8 Lakhs with an average annual salary of ₹ 5.0 Lakhs. Salary estimates are based on 2k latest salaries received from Java Full Stack Developers.

Companies providing the job opportunities for Full Stack Developer Engineers:

There are many companies in India that provide job opportunities for Java Full Stack Developer professionals. Some of the top companies in this field include:

1. Accenture
2. Tata Consultancy Services
3. IBM India Pvt. Ltd.
4. Capgemini
5. Verizon
6. Mindtree
7. Wipro
8. Virtusa
9. Freelancer

Apart from these companies, there are many other smaller and mid-sized companies in India that provide job opportunities for Java Full Stack Development. Additionally, many Indian start-ups in this field offer exciting job opportunities and innovative work culture.

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2. Web Design

Web design refers to the design of websites that are displayed on the internet. It usually refers to the user experience aspects of website development rather than software development. Web design used to be focused on designing websites for desktop browsers; however, since the mid-2010s, design for mobile and tablet browsers has become ever-increasingly important.

A web designer works on the appearance, layout, and, in some cases, content of a website. Appearance, for instance, relates to the colors, font, and images used. Layout refers to how information is structured and categorized. A good web design is easy to use, aesthetically pleasing, and suits the user group and brand of the website. Many webpages are designed with a focus on simplicity, so that no extraneous information and functionality that might distract or confuse users appears. As the keystone of a web designer's output is a site that wins and fosters the trust of the target audience, removing as many potential points of user frustration as possible is a critical consideration.

Skills to be acquired:

Proficiency in Web Design:

A web designer is also supposed to know how to code. He must be proficient with HyperText Markup Language to be able to put content on a web page and give it a structure. As a web designer, you should be able to put headlines, footers, paragraphs and graphics in a website. Therefore, having skills in HTML will go a long way in helping you complete your projects.

Technical Knowledge:

To succeed in their web design careers, these full-stack designers are expected to be highly proficient in the arenas of graphic design, proprietary software, UX/UI, SEO, code writing, and so on. In other words, these designers are required to deal with both front-end and back-end designing processes in an efficient, futuristic and effective way. However, for doing this, they need to acquire some basic web designer skills such as HTML, CSS, Bootstrap, Javascript, Node JS, Angular JS, React JS, PHP, Java, Python, Web Server Management, Search Engine Optimization (SEO), Content Management System (CMS), Digital Marketing etc..



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Technical skills include:

Coding - HTML, CSS, Javascript, jQuery, Dreamweaver

Programming - .net, XML/XSLT, ASP, PHP, Python, Django

Design and graphics - InDesign, Illustrator, Photoshop, Flash

Content management system (CMS) - Wordpress, Adobe Business Catalyst, Drupal, Joomla, Ektron, Zope.

Problem-Solving Skills:

Web designers should possess functional problem-solving skills to enable them to create flawless sites. Problem-solving skills are crucial for success in Web Design it includes Critical thinking, Troubleshooting, Design optimization, Debugging, Decision-making, Creativity, Communication, Time management, and Attention to detail.

Communication and Collaboration:

Communication is a necessity for almost any business professional, but it's incredibly important in web design. A designer must not only understand the goals of the business but also be able to convey their decisions to the client and explain why they contribute to the success of the website.

Being able to communicate clearly and get in touch with others is essential. One must be able to keep others updated on the progress of what is ongoing and clarify any issues that may arise. Communicating helps to convey any information, whether technical or not in a way that is easily understood. Being able to communicate helps your design to be recognised by other team members who are a significant boost to work.

Collaboration: The ability to work effectively in a team environment, including the ability to share knowledge and expertise, provide and receive feedback, and resolve conflicts.

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Courses to be completed:

There are several courses that one can complete to gain proficiency in Web Design. The fundamental concepts and practical skills in this field are obtained from the courses Basics of Web Development & Coding Specialisation, CSS Basics, Designing the User Experience, Introduction to HTML & CSS, UX & Web Design Master Course: Strategy, Design, Development and many more.

Job Prospects and Salary Expectations:

A website is a business's online representation. So it becomes imperative for every business to focus on making it not only visually appealing but also optimally functional in every sense, including its design, features, navigability, and other important aspects. A business website is a doorway through which potential customers can visit a business and see how different it is from other businesses.

So if you are thinking of making a career in web designing or switching careers, you should know that there are ample web designing career opportunities available.

Salary Expectations: Web Designer salary in India ranges between ₹ 20 Lakhs to ₹ 5.5 Lakhs with an average annual salary of ₹ 2.4 Lakhs. Salary estimates are based on 16.5k latest salaries received from Web Designers.

Companies providing the job opportunities for Web Designers are:

- | | |
|-----------------------------------|-------------|
| 1. Freelancer | 6. Amazon |
| 2. Tata Consultancy Services | 7. Deloitte |
| 3. Indus Net Technologies | 8. Indegene |
| 4. CodeClouds | 9. Xcelserv |
| 5. Cognizant Technology Solutions | |

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3. Testing

Software testing is the process of evaluating and verifying that a software product or application does what it is supposed to do. The benefits of testing include preventing bugs, reducing development costs and improving performance.

Here's a detailed overview of the skills to be acquired, courses to be done, job prospects, salary expectations, and companies providing job opportunities for Test Engineers

Skills to be acquired:

Proficiency in Testing:

Proficiency in Testing requires a strong foundation in verification and validation, technical, analytical and soft skills. The main goal of software testing is to find bugs as early as possible and fix bugs and make sure that the software is bug-free.

Technical Knowledge:

Automation is advancing at an astonishing rate and making its way to the forefront of the technology industry, and Software Testing is no different. Automation testing uses automation tools to increase the efficiency and accuracy of testing procedures, eliminate human error and provide faster feedback times. It is useful to get familiar with the top automation testing tools, like Selenium.

Problem-Solving Skills:

In software development, problem-solving is the process of using theories and research to find solutions to a problem domain, while testing different ideas and applying best practices to achieve a desired result. Problem-solving also has to do with utilizing creativity and logical thought processes to identify problems and resolve them with software.

Courses to be completed:

There are several courses that one can complete to gain proficiency in Testing some of the automation testing tools are as follows, Selenium, Testrail, Testpad, Tusk, Testmo, SpiraTest etc.

Job Prospects and Salary Expectations:

Job prospects: You may start your career as a software tester on a graduate scheme or via an entry-level position. Career progression can be rapid. The speed at which you progress will

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depend on your experience, your exposure to different systems, and awareness of testing methods. Professional qualifications and technical skills will help to speed up your progression.

Some software testers progress into senior software testing roles, including:

- senior software tester
- software test team lead
- test manager.

Salary Expectations:

An entry-level Software Tester with less than 1 year experience can expect to earn an average total compensation (includes tips, bonus, and overtime pay) of 2.5 Lakhs. An early career Software Tester with 1-4 years of experience earns an average total compensation of 3.2 Lakhs. A mid-career Software Tester with 5-9 years of experience earns an average total compensation of 6 Lakhs. An experienced Software Tester with 10-19 years of experience earns an average total compensation of 10 Lakhs.

Companies providing the job opportunities for Test Engineers:

There are many companies in India that provide job opportunities for Test Engineers. Some of the top companies in this field include:

1. Hike QA Business Services.
2. Information System Pvt Ltd
3. Tata Consultancy services.
4. International Business Machines
5. Capgemini Pvt Ltd

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4. Networking

A network engineer is a technology professional who has the necessary skills to plan, implement and oversee the computer networks that support in-house voice, data, video and wireless network services. Although the job titles *network engineer* and *network administrator* are sometimes used as synonyms, a network engineer usually has more executive responsibilities than a network administrator.

Here's a detailed overview of the skills to be acquired, courses to be done, job prospects, salary expectations, and companies providing job opportunities for Lab View Professionals.

Skills to be acquired:

Technical Knowledge:

Network engineers can complete their expected tasks by possessing strong technical skills. Technical skills for network engineers often relate to computer science and information technology applications and may include abilities like configuring routers and managing system firewalls. This professional may also be able to implement network security measures and follow protocols as their organization dictates them.

Problem-Solving Skills:

Network engineers need to be capable of solving highly complex mathematical and technical problems. For example, this professional needs to know how to troubleshoot issues within an organization's networks to optimize performance. Problem-solving also encompasses the ability to apply new and innovative solutions to work through challenges in the workplace, whether it's managing IT security networks or working on a team to complete a company-wide project.

Analytical skills:

Analytical skills, such as the ability to break down complex problems and evaluate technical processes, are important to a network engineer's career. This professional also needs to be able to apply the appropriate operations for specific tasks. Brainstorming and creative thinking techniques for developing initiatives or progressing projects are also highly important for working effectively in this position.

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Courses to be completed:

The courses that can help you gain proficiency in Networking:

1. **CCNA:** Earning a Cisco Certified Network Associate (CCNA) is one of the best ways for you to prepare for a successful career in networking.
2. **CCNP:** If you already have the CCNA, your next goal should be to take the CCNP Certification (Cisco Certified Network Professional). Each professional-level certification requires only two exams: one core exam and one concentration exam of your choice, so you can focus on your interests and needs.
3. **CCIE:** The CCIE (Cisco Certified Internetwork Expert) is still considered one of the most prestigious certifications in Network Engineering. Since the 2020 update, there are 7 CCIE Tracks you can take. Namely the following: CCIE Enterprise Infra, Wireless, Data Center, Security, Service Provider, Collaboration and Design Expert.

Job Prospects and Salary Expectations:

Job Prospects: It's a good time to consider a career in Network Engineering. Network engineers get the opportunity to work in almost any industry alongside a team of skilled IT professionals. And with more companies making the shift to big data, cloud computing and social media, the Bureau of Labor Statistics projects a steady growth in the demand for network engineers and system architects.

Some of the popular job roles for network engineer includes Network maintenance, Network architect Engineer, Network security etc.

Salary Expectations: Network Engineer salary in India ranges between ₹ 1.7 Lakhs to ₹ 8.1 Lakhs with an average annual salary of ₹ 3.3 Lakhs.

Companies providing the job opportunities for Network Engineers:

There are many companies that provide job opportunities for Network Engineers in various industries. Here are some examples:

- | | |
|----------------------------------|------------------------------|
| 1. CISCO Systems India Pvt Ltd | 4. Tata Consultancy services |
| 2. Datagami technologies Pvt Ltd | 5. Infosys Private limited |
| 3. Wipro Pvt Ltd | |

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5. Data Science

Data science is the study of data to extract meaningful insights for business. It is a multidisciplinary approach that combines principles and practices from the fields of mathematics, statistics, artificial intelligence, and computer engineering to analyze large amounts of data.

Here's a detailed overview of the skills to be acquired, courses to be done, job prospects, salary expectations, and companies providing job opportunities for Data Science Engineers

Skills to be acquired:

Proficiency in Data Science:

A proficient data scientist requires a deep understanding of data structures, algorithms, and statistical modeling techniques. They should also have expertise in programming languages such as Python, R, SQL, and others. Additionally, they should have domain-specific knowledge related to the industry they are working in, such as finance, healthcare, marketing, or others.

Technical Knowledge:

Technical knowledge in data science encompasses a wide range of skills and tools that are used to collect, process, analyze, and interpret data. Some of the key technical skills that are required for data science includes Programming languages, Data visualization, Machine learning, Statistical analysis, Data engineering, Big data technologies, Cloud computing, Data ethics.

Problem-Solving Skills:

Problem-solving skills are essential for data scientists as they need to identify business problems, develop solutions, and make data-driven decisions. Some problem-solving skills that are important in data science are Critical thinking, Hypothesis testing, Data exploration, Problem decomposition, Experiment design, Optimization, Decision making, Creativity and Collaboration.

Improving problem-solving skills requires practice and experience. Data scientists can develop these skills by working on real-world projects.

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Communication and Collaboration:

Communication and collaboration are crucial skills for data scientists, as data science is often a team effort that requires effective communication and coordination among team members. Communication is key to any data science role. As a data scientist, you will be relied upon to communicate your findings and recommendations to non-technical colleagues. This may include senior management, other departments within your company, or even customers.

Data collaboration is the sharing of information between different companies, clients, or employees. This not only helps businesses stay up-to-date on market trends, but it also allows them to communicate with each other more effectively.

Courses to be completed:

There are several courses that can be completed in data science, depending on the individual's level of experience and career goals. Some of the courses in data science are Machine Learning, Big Data, Data Visualization, Deep Learning, Natural Language Processing, Data Mining, Business Analytics, Cloud Computing, Pandas, Tableau.

Completing these courses can help individuals develop the technical and problem-solving skills required for a career in data science.

Job Prospects and Salary Expectations:

Job prospects: Data science is a rapidly growing field with strong job prospects. With the increasing amount of data being generated by organizations, there is a high demand for data scientists who can help analyze this data and provide insights to drive business decisions.

Job prospects in data science are:

- Data Scientist
- Data Analyst
- Business Intelligence Analyst.
- Data Architect
- Data Science Manager

Salary Expectations:

Salary expectations for data science professionals in India can vary depending on the level of



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experience, skills, and location. Generally, data science is considered a high-paying field in India. The average salary for a data scientist in India is around ₹8 lakhs to ₹15 lakhs per year, depending on experience. The average salary for a data analyst in India is around ₹4 lakhs to ₹8 lakhs per year. The average salary for a business intelligence analyst in India is around ₹6 lakhs to ₹12 lakhs per year. The average salary for a data architect in India is around ₹12 lakhs to ₹20 lakhs per year. The average salary for a data science manager in India is around ₹20 lakhs to ₹30 lakhs per year, depending on experience.

Companies providing the job opportunities for Data Science Engineers:

There are many companies in India that provide job opportunities for Data Science Engineers. Some of the top companies in this field include:

1. Fractal Analytics
2. Amazon.com Inc.
3. Deloitte
4. LinkedIn Corporation
5. Flipkart
6. IBM India Pvt. Ltd
7. Facebook Inc.
8. Google
9. Apple Inc.
10. Airbnb Inc.

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6. Cyber Security

Cyber security refers to every aspect of protecting an organization and its employees and assets against cyber threats. As cyberattacks become more common and sophisticated and corporate networks grow more complex, varieties of cyber security solutions are required to mitigate corporate cyber risk.

Here's a detailed overview of the skills to be acquired, courses to be done, job prospects, salary expectations, and companies providing job opportunities for Cyber Security Engineers

Skills to be acquired:

Proficiency in Cyber Security:

Proficiency in cybersecurity involves understanding the technologies, processes, and practices that are used to protect computer systems, networks, and data from unauthorized access, theft, damage, or disruption. Proficiency in cybersecurity is important for individuals who work in roles such as cybersecurity analyst, security engineer, security architect, security operations center (SOC) analyst, and chief information security officer (CISO). Additionally, proficiency in cybersecurity is increasingly important for professionals in other IT and business roles, as cybersecurity threats continue to evolve and affect all areas of organizations.

Technical Knowledge:

Technical knowledge in cybersecurity involves understanding the underlying technologies and tools that are used to secure computer systems, networks, and data. Some key technical areas in cybersecurity are Cryptography, Network security, Operating system security, Application security, Cloud security, Mobile security, Incident response.

Problem-Solving Skills:

Problem-solving skills are crucial in cybersecurity, as the field is constantly evolving and presents new challenges and threats. Some key problem-solving skills that are important in cybersecurity are Analytical skills, Critical thinking, Attention to detail, Creativity, Technical expertise, Communication skills and Collaboration.

Communication and Collaboration:

Communication and collaboration are crucial skills for cyber security professionals, as cyber security is often a team effort that requires effective communication and coordination among team members. Security collaboration enables organizations in one sector to learn from threats witnessed by enterprises in other sectors and proactively take required mitigation measures and defend against common threats.

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A solid cybersecurity communications strategy will include data breach response preparations, staff and executive training for handling the situation, scenario testing and planning, and a crisis communication plan to manage the issue and get back to business as usual.

Effective communication and collaboration skills can help cyber security professionals work more efficiently and effectively, resulting in a stronger security posture for their organization.

Courses to be completed:

There are several courses that can help you build technical knowledge and problem-solving skills in cybersecurity. The courses that can help you build the necessary skills to become a cyber-security engineer are Computer Networking, Operating Systems, Data Structures and Algorithms, Introduction to Cybersecurity, Cybersecurity Operations, Secure Coding, Penetration Testing, Ethical Hacking, Cryptography, Security Architecture and Design.

Job Prospects and Salary Expectations:

Job prospects: Cybersecurity is a rapidly growing field with a high demand for professionals in a variety of industries. As businesses and organizations continue to rely more heavily on technology and the internet, the need for cyber security professionals is only expected to increase. Some job roles in the field of cyber security include:

- Cybersecurity Analyst
- Cybersecurity Engineer
- Cybersecurity Consultant
- Security Architect
- Information Security Manager
- Penetration Tester
- Cryptographer
- Security Software Developer
- Ethical Hacker
- Chief Information Security Officer (CISO)

Salary Expectations:

Cyber Security salary in India ranges between ₹ 2.0 Lakhs to ₹ 17.2 Lakhs with an average annual salary of ₹ 5.0 Lakhs.



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Companies providing the job opportunities for Cyber Security Engineers:

There are many companies in India that provide job opportunities for Cyber Security Engineers. Some of the top companies in this field include:

1. 3P&T Security Recruiting
2. Alta Associates
3. Caliber Security Partners
4. Cyber Exec
5. Cyber 360 Inc.
6. Sophos
7. AMBC Inc.
8. Pearl Technologies Ltd.
9. Sony India Software Centre
10. Harsco Corporation

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